

## **ABSTRACT**

This project deals with a proposed solution to the current problem of materials that are not delivered at the required date and in required quantities. This problem leads to delay deliveries and creates back order quantities. A solution for this problem will improve customer satisfaction. The purpose of this study is about Material Requirement Planning and Safety stock. Demand data was analyzed to find a demand pattern by using the simple moving average forecast technique. The purpose of this project is to make sure that the materials and end-products come to the company and are delivered to the customers at the right time and in the right quantities to meet customer satisfaction and company cost.

This study is conducted to evaluate the benefits of Material Requirement Planning with the safety stock policy. In addition, a measurement and evaluation of the advantages and disadvantages in the comparison between current process and new proposed processes of MRP, Safety and Demand forecasting will be conducted. The alternative optimal solution for the company will also be found.

The purpose of this project is to reduce the back order quantities and to improve inventory cost to be optimal. Consequently, total lead time is reduced by 4 days. Human error in planning that leads to material shortage is reduced from 21% to be 0% due to computer based systems. 60% service level is the optimal solution for the company to minimize the total cost by balancing between the stock-out cost, warehouse cost, inventory holding cost, ordering cost and purchasing cost. Expected Backlog quantity is reduced by 8,413 units per year or 4% reduction. The total cost saving is 104,063,957 Baht per year or 7% cost reduction. Another, optimal solution is to maximize the customer service level at 95%. The company has to carry out high level of inventory even by using the MRP to satisfy the customers, to reduce the back order, to reduce the loss sale, to increase the profitability and economics of scale. This research also provides the alternative was to reduce costs of carrying inventory by differentiating customer in different service levels. These leads to reduce the total cost by 124,214,011 Baht per year for the maximum customer service level option.

MRP is the tool to make the total cost and back order quantity lower by the concept of “Right time, Right Quantity”. The demand and lead time is variable. Safety stock is necessary to prevent the stock-out for customer satisfaction and production needs. To optimize the solution for the Material Requirement Planning system, the safety stock policy must be considered at the right service level. Otherwise, it will lead to high inventory cost. The details and alternative ways of determining the optimal solution in order to minimize the cost is to balance the customer service level and the total cost of each service level. Moreover, the benefit of MRP is to reduce the lead time for improving the inventory turn in financial statement, reducing the inaccuracy of the manual work, for adsorbing the changes, for multi-products in the company and for complexity of component parts.